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Journal of the Society of Arts.

FRIDAY, JULY 20, 1866.

Announcements by the Council.

Musical Education.

The Council met on Wednesday, the 18th inst., and took into consideration the report of the Musical Education Committee, published in the last number of the *Journal.*

Examinations, 1867.

The Programme of Examinations for next year is in preparation, and will shortly be ready for issue.

International Horticultural Exhibition and Botanical Congress.—Prizes for Implements.

It will be remembered that the Council of the Society of Arts, wishing to aid this undertaking, consented to offer prizes (amounting to £50) for subjects exhibited in Section IX., under Classes 231 and 232.

The following is the list of prizes offered, and of the awards made:—

Class 231.

(A.)—Half-size model, showing the best principle of construction for a tent for horticultural exhibitions, capable of being extended by a multiplication of the parts exhibited. A prize of £10. No award.

(B.)—The best transplanting machine for weights of eight tons and upwards. A prize of £10.—No award.

(C.)—The best transplanting machine for half-ton weights and upwards to two tons. A prize of £5.—Prize awarded to Mr. McIndoe.

(D.)—The best method of ventilating plant structures, to be shown by a model. A prize of £5.—Prize awarded to Messrs. Sanders, Frewen, and Co.

(E.)—The best garden wheelbarrow in principle of construction. A prize of £3.—No award.

(F.)—The best sunshade for garden seats. A prize of £3.—Prize awarded to Mr. T. L. Scowan.

(G.)—The best guard for protecting young trees from animals in parks, orchards, and pleasure-grounds. A prize of £3.—Prize awarded to Mr. W. Early.

(H.)—The best instruments for working to levels and slopes in garden-ground work. A prize of £2. —No award.

Class 232.

(A.)—Earthenware boxes for edgings, capable of producing any length of straight and curved lines for borders in conservatories. A prize of £3.—No award.

(B.)—Ornamental flower pots of large dimensions, of common red clay, for specimen plants, and for terraces. 1st prize, £3; 2nd prize, £2; 3rd prize, £1.—No award.

Proceedings of Institutions.

Burnley Mechanics' Institution.—The report for the year 1865 is presented under much more favourable circumstances than was that for the year 1864. At the close of 1864, and during several months of the year 1865, a large proportion of the operatives of the town were dependent on charitable aid, while an equal if not a greater number were supported by the relief afforded by the Poor-law Guardians. The improved condition of the operatives has already favourably affected the Institution, more especially in the number of entries to the evening classes; the numbers at the close of the year on the register being—males, 182; females, 85—total, 267. The numbers in the corresponding period of 1864 were—males, 150; females, 66—total, 216, showing an aggregate increase of 51. At the commencement of 1865, class attendance was comparatively low, but the results of the local and national examinations for the year prove the diligence and progress of the scholars to have been commendable. The following were the awards to the candidates from this Institution in 1865:—By the East Lancashire Union fourteen prizes, ranging in value from 5s. to 30s., and seven certificates. By the Lancashire and Cheshire Union, two prizes, value of £1 each, and ten certificates. By the Department of Science and Art, three first-class Queen's prizes, one of them being accompanied with the Gold Medal of the Department; three second-class Queen's prizes, four third class, and seven fourth class; also eight candidates passed with credit. By the Society of Arts, two prizes of £5 and one of twenty-five guineas; four first-class certificates, nine second, and six third. The distinguished success of one of the candidates, Thomas Healey, demands separate and especial notice. To him the Department of Science and Art awarded, for Elementary Mathematics, a first-class Queen's prize, with Gold Medal, which is given by the Department for special excellence only. The Society of Arts awarded to him (in 1865 and in preceding years) several first-class certificates and prizes, and the Prince Consort's prize of twenty-five guineas. In the early part of the year a series of "Penny Readings," combined with vocal and instrumental music, was given in the Assembly-room with great spirit and ability, chiefly by members of the Institution. These entertainments attracted large and approving audiences, and while they afforded inexpensive and intellectual amusement to the members of the Institution and the public, they uniformly yielded a balance in favour of the funds of the Institution. The acknowledgments of the directors are eminently due to the ladies of Burnley and the neighbourhood, for their liberal donations at the *soirée.* These donations, amounting to £101 13s. 3d., have materially improved the financial statement. To their repeated contributions the Institution is greatly indebted for its present position and efficiency. The statement of receipts and expenditure for the year shows the total income to be £702 5s. 1½d., and that a balance of £19 6s. 4½d. is due to the treasurer, being considerably less than in the former year.

EXAMINATION PAPERS, 1866.

The following are the Examination Papers set in the various subjects at the Society's Final Examinations, held in April last:—

(Continued from page 567).

CONIC SECTIONS.

three hours allowed.

Section I.—Geometrical Conics.

1. What is a cone? Show that a section of a cone made by a plane which cuts both slant sides is a *symmetrical* curve.

2. Prove that the tangent to a conic, measured from the point of contact to the directrix, subtends a right angle at the focus.

3. Draw a pair of tangents to a parabola from a point without it.

4. If SY is the perpendicular from S, the focus of a parabola, on the tangent at P, prove that—

(1.) Y is on the tangent at the vertex.
(2.) $SY^2 = SA \times SP$.

5. Define an ellipse, its centre, foci, vertices. If the major and minor axes of an ellipse are given, how can the ellipse be described by continuous motion, and what will be its area?

6. Prove that in the ellipse $CN \times CT = CA^2$, where C is the centre, and T is the point in which the tangent at P meets the major axis, NP being the ordinate. What is the corresponding property of the parabola?

7. What are conjugate points on an ellipse? If P and D are conjugate points, show that $SP \times PH = CD^2 : CP^2 + CD^2 = CA^2 + CB^2$.

8. Prove that the tangent at any point of a hyperbola bisects the angle between the focal distances.

9. Prove, by the method of projections or otherwise, that the hyperbola has asymptotes.

10. If the chord Qq of a hyperbola meets the asymptotes in R and r, prove that $QR = qr$. Hence prove that the area of a triangle contained between the asymptotes of a hyperbola and a tangent is constant.

11. Prove that all conics may be projected into circles. Hence prove Pascal's theorem.

Section II.—Analytical Conics.

12. Determine the relation between the constants when $y = mx + c$ is perpendicular to $y = nx + b$. Find the length of the perpendicular from (x_1, y_1) on $ax + by + c = 0$.

13. What is the area of the triangle contained between the three lines $y = mx, y = nx, ax + by + c = 0$? Show that the result expresses space in two dimensions.

14. Find the centre and radius of the circle whose equation is

$$x^2 + y^2 - 4x + 6y - 3 = 0.$$

What are the equations to the tangents which are equally inclined to the co-ordinate axes?

15. If the base and vertical angle of a triangle are given, prove that the locus of the vertex is a circle.

16. Prove analytically the theorems contained in 4, 6, 7, 10 of the preceding section.

17. Find the polar equation of the ellipse, when the focus is the pole. What does the equation become when $e = 1$?

18. Prove that the locus of the middle points of a system of parallel chords of a parabola is a straight line parallel to the principal diameter of the curve.

NAVIGATION AND NAUTICAL ASTRONOMY.

THREE HOURS ALLOWED.

Section I.

1. The arc joining the poles of two great circles subtends an angle at the centre equal to their inclination; and the point of intersection of the great circles is the pole of the great circle in which the poles lie.

2. The area of a spherical triangle is the same fraction of the area of a hemisphere that the excess of sum of its three angles above two right angles is of 360°.

3. In any spherical triangle prove the formula:—

$$\text{Cot. } a \text{ Sin. } b = \text{Cot. A Sin. C} + \text{Cos. } b \text{ Cos. C.}$$

Section II.

1. Prove the formulæ:—

$$\text{Tan. } \tfrac{1}{2}(a + b) = \frac{\text{Cos. } \frac{1}{2}(\text{A} - \text{B})}{\text{Cos. } \frac{1}{2}(\text{A} + \text{B})} \text{Tan. } \tfrac{1}{2} c.$$

$$\text{Tan. } \tfrac{1}{2}(a - b) = \frac{\text{Sin. } \frac{1}{2}(\text{A} - \text{B})}{\text{Sin. } \frac{1}{2}(\text{A} + \text{B})} \text{Tan. } \tfrac{1}{2} c.$$

2. One angle of a triangle is a right angle. Write down the equations which connect the other angles and the sides, and prove them.

3. Having given the three angles of a spherical triangle, find the sides.

Section III.

1. Find the compass course and distance from A to B, having given—

Lat. A 35° 18′ N. Variation 2 pts. E. Long. A 85° 18′ W.
„ B 35° 18′ N. Deviation 8° 50′E. „ B 43° 22′ W.

2. On June 23rd, at noon, a point of land in lat. 45° 27′ N., long. 15° 35′ W., bears by compass N.N.W., variation 1¾ pt. E., deviation 8° 15′ W., distant 15 miles; afterwards sailed by compass during the next 24 hours as follows:—

K.	10ths.	Courses.	Wind.	Leeway.	Deviation.
79	8	ENE	EbS	1¼	8° 15′ E
58	5	SbW	ESE	1	9° 12′ W
75	7	NNE½E	WNW	1¾	8° 30′ E

Required the latitude and longitude in on June 24th at noon.

3. Required the distance on a great circle from A to B given.

$$\begin{array}{llll} \text{Lat. A} & 18^\circ\ 16' \text{ N} & \text{Long. A} & \left. 33^\circ\ 12' \right\} \text{W.} \\ \text{,, B} & 53^\circ\ 21' \text{ N} & \text{,, B} & 75^\circ\ 18' \end{array}$$

Section IV.

1. Feb. 11th, 1866, in long. 100° 15′ W, the observed meridian altitude of the sun's lower limb was 36° 25′ 10″ (zenith N of the sun) index error + 3′ 15″ and the height of the eye above the sea was 12 feet. Required the latitude.

2. June 9th, a.m. in lat. 10° S, long. 31° 30′ E, when a chronometer showed 7h. 33′ 35″ (it being June 9th, a.m. at Greenwich) the observed alt. sun's L.L. was 42° 35′ 10″. Index error + 1′ 50″ and the height of the eye above the sea 19 feet. Required the longitude.

On May 8th at noon, the chronometer was too fast on G. M. time 36′ 10·5″, and its daily rate was 2·5″ losing.

Section V.

1. Define *course*, *distance*, *rhumb-line*, and *departure*, and illustrate by a diagram.

2. Prove that distance = departure × cosec. course.

3. Prove the rule for finding the meridional parts for a given latitude.

Section VI.

1. Obtain an expression for computing the altitude of a given celestial body for a given time.

2. Prove the rule for finding the latitude by altitudes of any celestial object observed near the meridian.

3. Prove a rule for clearing a lunar distance of the effects of refraction and parallax.

Section. VII.

Describe the sextant, and prove the rule for graduating it.

Section VIII.

1. December 4th, at 8h 10m a.m., latitude 50° 15′ N., long. 160° 45′ E., the sun rose by compass S. 61° 15′ E., the ship's head being N., deviation 2° 45′ E., when the observed altitude of sun's L.L. was 7° 10′ 40″. The index error + 2′ 10″, and the height of the eye 17ft. Required the variation.

2. September 23rd, in lat. 47° 58′ N., long. 67° E., the following double altitudes were observed:—

Mean time nearly.	Chronometer.	Obs.alt.Sun'sL.L.	True bearing.
9h. 30m. a.m.	9h. 31′ 40″	36° 20′ 40″	S.E.b.E.
1h. 40m. p.m.	1h. 41′ 30″	30° 15′ 20″	S.W.b.W.

The run of the ship in the interval was S.b.W. 18 miles, the index error was + 3′ 40″, and the height of the eye was 20 feet. Required the latitude at the time of taking the second observation.

PRINCIPLES OF MECHANICS.

THREE HOURS ALLOWED.

1. How are forces geometrically represented? State some cases in which forces acting on a particle evidently balance one another.

2. Into how many classes, and according to what distinctions, are levers usually divided? Give examples of each class. Prove that in the most general case the moments of the forces which balance one another on a lever about the fulcrum are equal.

Ex. Two weights of 3 lbs. and 7 lbs. respectively hang from the extremities of a lever one yard long; find the fulcrum, (1) on the supposition of the lever being weightless; (2) on the supposition of its weighing 10 lbs.

A body placed in one scale of a false balance appears to weigh 9 lbs., when placed in the other to weigh 16 lbs. What is its true weight?

3. Show that every system of particles and every body of matter has one and only one centre of gravity. How would you practically find it in each of the cases?

A straight wire 5 feet long is composed of two pieces of 3 feet and 2 feet in length respectively. The former is composed of matter which weighs 1 oz. per foot, and the second of matter which weighs $3\frac{1}{2}$ oz. per yard. Find the centre of gravity of the whole wire.

4. What is meant by the principle of virtual velocities? Prove that it exists in the case of the screw.

5. State the experimental laws of statical and dynamical friction. Prove that the coefficient of friction is equal to the tangent of the limiting angle of resistance.

6. What is meant by the expression "Accumulated work?"

Required the work accumulated in a ball whose weight is 5 lbs., and whose velocity is 10 feet per second.

7. Prove that if, the ordinary units being chosen, U express the work accumulated in a body, V its velocity, W its weight, g the accelerating force of gravity,

$$U = \frac{V^2 \times W}{2g}$$

A train weighing 60 tons has a velocity of 40 miles per hour when the steam is turned off, how far will it ascend an incline of 1 in 100, taking the friction at 8 lbs. per ton?

8. What is meant by the centre of gyration? Investigate its position in a plane ring like the rim of a fly-wheel.

The weight of a fly-wheel is 13 cwts. The internal and external diameters of the ring are 9 and 10 feet. Find the centre of gyration. The wheel makes 30 revolutions per minute. The diameter of the axis is 3 inches, and the friction upon it one-seventh of the whole weight. How many revolutions will the wheel make before it stops?

9. Describe the common wheel barometer. What are its *peculiar* defects? What are those which it shares with the common barometer? How are they remedied in the best instruments?

Why does a barometer fall in unsettled weather?

10. Explain the action of the syphon. For what purposes is it commonly used? Explain by it the cause of intermittent springs.

11. A sloping embankment is subjected to the pressure of water. Supposing it to be of the form of a rectangle, investigate (1) the amount of pressure; (2) the point where the resultant acts.

Required the pressure on the staves of a cylindrical barrel filled with water, the diameter of the base being 3 feet and the height 4 feet.

12. Describe a fire-engine.

The section of the pipe of a fire-engine is 1 sq. inch, and the velocity of the water discharged is 50 feet per second. Required the horse-power necessary to work the engine.

13. What is the distinction between a simple and a compound pendulum? Prove that in the latter the centres of suspension and oscillation are reciprocal.

Determine the distance between them in a body that vibrates in 3 seconds.

14. Supposing the annual fall of rain over the whole earth to be 4 feet in depth, and to have descended from the height of half a mile, what is the work of the sun by evaporation in the course of a year, estimated in horse-powers?

PRACTICAL MECHANICS.

THREE HOURS ALLOWED.

1. Upon what principle are the teeth of a pair of wheels arranged, when the wheels are required to communicate motion between two shafts, whose directions meet at right angles in a point, and one of which is to rotate faster than the other in the proportion of three to two?

2. Define a *screw surface*, and the *pitch* of a screw. What are the forms of screw thread usually employed, and how do they differ in their mechanical properties?

3. Explain the contrivance known as the *eccentric*, and show that it is a mechanical equivalent for the crank and connecting rod.

4. Describe some form of quick return movement suitable for actuating the table in a planing machine.

5. Explain the method of arranging change wheels in a screw cutting lathe, and select some numerical example to show how a screw of a required pitch may be cut in a given lathe.

6. In a train of three wheels in gear, whereof the first is fixed, and the other two are attached to an arm, which is capable of revolving about the centre of the first wheel, upon what principle can you arrange that the third wheel shall be carried round upon the arm without rotating at all upon its own axis? Hence show how a wire sheathing may be laid upon a rope without any twist being given to the wires.

7. What is the action of the fusee of a spring clock?

8. Explain the different modes in which the steam acts in the atmospheric, condensing, and high pressure steam-engines, pointing out the great improvement introduced by Watt.

9. Describe some form of steam slide-valve, and explain its action.

10. Why is it economical to work steam expansively?

11. Explain the principle upon which a locomotive boiler is constructed.

12. Why did the introduction of the screw propeller render a modification of the marine steam-engine necessary? Describe the general arrangement of a trunk engine, and the form of a screw propeller.

(To be continued.)

MUSIC IN ENGLAND.

Brief Notes on Music in England from the Time of the Anglo-Saxons to the Commencement of the 18th Century, and the Aid Afforded by the Crown, &c., to its Support.

As far as can be ascertained from the authorities which have been consulted, the condition of music in England at the period from the 7th to the end of the 15th century is obscure.

The ancient Bards are intimately connected with the early history of poetry and music. The Scald of the Runic mythology, and the Minstrel of the baronial castle, are only varieties of the same genus. Bards may be said to be almost indigenous to the principality of Wales, and the bardic institutions of the Irish bear a strong affinity to those of the Welsh.

Cadwaladyr, the last king of Britain, is supposed to have first regulated the minstrelsy of the bards. He died at Rome about 590. According to Wotton, the bards were divided into three classes, and fixed stipends were attached to each. The first class were makers or poets; the second were the players on the harp; and the third, or lowest order, accompanied the music of others by their voices. However inferior to the two former ranks, their science was not inconsiderable. They tuned and understood the harp; they were conversant with the twenty-four measures of instrumental music and the twenty-four modes of metrical composition. At a royal wedding their post was to wait on the bride. Every three years a solemn assembly (Eisteddvod) of princes and chieftains was held, and degrees of rank were conferred on those bards who distinguished themselves in the contest of the Muses. The chief bard was in rank the eighth officer of the king's household, receiving from the hand of the monarch a harp, from which he promised never to part. His land was held free, and he had many other privileges. No Eisteddvod has been held by royal commission since the 9th year of Queen Elizabeth's reign (1567). This commission is said to exist, and to be in the possession of the Mostyn family. (Encyclop. Metrop. art. *Bard.*)

The author of "Music and the Anglo-Saxons" (Francis D. Wackerbarth) says, p. 46, "The Anglo-Saxons, previous to their arrival in England, possessed an epic poem (Beowulf), and from it may be learned that music was a great amusement of our ancestors, and constantly called in to aid the festival and banquet. Bede, in his account of the poet Ceadmon, infers that the Anglo-Saxon youth were accomplished in music. Music formed one of the four divisions of education at this period, and Bede and Alcwine wrote treatises on it. 'Music,' says the venerable presbyter, 'is the most worthy, courteous, pleasant, joyous, and lovely of all knowledge; it makes a man gentlemanly in his demeanour, pleasant, courteous, joyous, and lovely. ......It refreshes the troubled spirit, removes sorrow and headache (*dolorem capitis*), expels foul spirits, and cures crossness and melancholy.'" (Vol. i., 353.)

The instruments then in use, according to Bede, were the organ, viol, harp, atola (?), psaltery (a kind of harp-lute), drum, and cymbals.

"The organ," says Bede, quoting from Cassiodorus, who died in the sixth century, "is, as it were, a tower built up of many pipes, from which by the blast of bellows a most copious sound is obtained; and that the same may be composed of fit melody, it is furnished on the inside with wooden tongues, which, being skilfully depressed by the master's fingers, produce grand and very sweet music." The organs of the Anglo-Saxons seem to have much resembled those of modern times, even in external decoration. At the beginning of the eighth century (A.D. 709) the pipes were gilded. (Aldhelm. De laude Virginum, tom. xiii., p. 3.) The metal employed was generally copper. Mr. Sharon Turner, in his "History of the Anglo-Saxons," vol. 3, p. 458, quoting Gale ("Historia Rameniensis," tom. iii., p. 420), says that "The Earl (Dunstan) devoted thirty pounds to making copper pipes of organs, which resting with their openings in thick order on the spiral winding in the inside," &c.

William of Malmesbury, who wrote about the year 1120, says that the Saxons had organs in their churches before the Conquest; and also records that Dunstan, in the reign of King Edgar, gave an organ to the Abbey of Malmesbury.

The harp was the common musical instrument of the Anglo-Saxons. The Welsh, or Cambro-Britons, called their harp *teylin*, a word of uncertain etymology. In the Erse its name is *crwth.*

"The harp was the favourite musical instrument of the Britons and other northern nations in the middle ages, as is evident from their laws and various passages in their history. By the laws of Wales, a harp was one of the three things that was necessary to constitute a gentleman or a freeman; and none could pretend to that character who had not one of these instruments, or who could not play upon it. To prevent slaves from pretending to be gentlemen, it was expressly forbidden to touch or to permit them to play upon the harp; and none but the king, the king's musicians, and gentlemen, were allowed to have harps in their possession. A gentleman's harp was not liable to be seized for debt, because the want of it would have degraded him from his rank, and reduced him to that of a slave. The harp was in no less estimation and universal use among the Saxons and Danes." ("Essay on the Ancient Minstrelsy in England," by W. Chappell.)

The Anglo-Saxons seem to have had varieties of the small harp. Some of these, according to Bede (vol. viii., p. 311), were stricken with the fingers, others with the plectrum or quill.

"The cymbals (*cymbala*) are small vessels, composed of mixed metal, which when stricken together on the concave side in skilful time, produce, by their delightful collision, a very sharp note."

The tradition that Alfred the Great paid a visit to the Danish camp disguised as a harper should be noted, if not as a historical fact, still as an illustrative myth.

In the "Archæologia" (vol. ii., p. 100, &c.) there is a paper entitled, "Observations on Dr. Percy's Account of the Minstrels among the Saxons," by Mr. Pegge. These critical observations are adverse to what Dr. Percy says in his essay on the ancient English minstrels, touching their state and condition in Saxon times; and that King Alfred (A.D. 878) in his visit to the Danish camp, did not disguise himself as a bard or minstrel, but rather as a mimic, jester, or jack-pudding. Spelman, in his "Life of Alfred" (p. 199), says, "that he (Ælfred) provided himself of musicians, not common or such as knew but the practick part, but men skilful in the art itself, whose skill and service yet further improved with his own instruction, and so ordered the manner of their service, as best testified the royalty of the king." Mr. Sharon Turner (vol i., p. 558) says, "His (Alfred the Great's) early predilection for the Saxon poetry and music, had qualified him to assume the character of an harper; and thus disguised, he went to the Danish tents. His harp and singing excited notice, &c."

"This excellent prince," says Burney, "not only encouraged and countenanced the *practice* of music, but in 886, according to the annals of the church of Winchester, and many ancient writers, founded a professorship at Oxford for the cultivation of it as a *science;* and the first who filled the chair was Friar John of St. David's, who not only read lectures upon music, but logic and arithmetic."

Church Music.

In 669, Theodore and Adrian, who planted learning among the Anglo-Saxons, also introduced into Kent the ecclesiastical chanting, which Gregory the Great had much improved. From Kent it was carried into the other English churches. In 678, one John came also from Rome and taught in his monastery the Roman mode of singing, and was directed by the Pope to diffuse it amongst the rest of the clergy, and left written directions to perpetuate it. Under his auspices it became a popular study in the Saxon monasteries. (See Bede, iv., 2, 18, and v. 22.)

Doctor Burney states (vol. 2, p. 24) that from the time of St. Gregory to that of Guido, there was very little distribution of keys, "nor were any semi-tones used but those from E to F, B to C, and occasionally A to B flat; and that there was no uniformity of chanting ordained till the time of St. Gregory, though there was a very early distinction between the manner of singing the hymns and chanting the psalms. St. Athanasius and Geronticus, a monk of Alexandria, and many of the fathers of the fourth century, have left testimonies and admonitions concerning this distinction." And in a note adds, "that it seems the chief distinction was, that the hymns were frequently sung by single persons, and the psalms generally chanted in a chorus of the whole congregation."

The union of music and dancing may be traced to the first oratorios or sacred dramas, which were first performed in churches. In "Hume's History of Great Britain" (vol. I., p. 200) is an account of the ceremonies used by Archbishop Laud in the consecration of St. Catherine's Church, in which the action of that prelate before the high altar is considered by Burney to amount to dancing, Laud being very desirous of reviving the religious observances of the Roman Catholics.

The word "Choir," meaning that part of a cathedral church where the canons and priests perform the ritual ceremonies of religion, is curiously derived from *χορος*, a dance or company of dancers. "Chorus" has the same derivation, and signifies a company of singers in a church, that is, a choir. According to the authority of the venerable Bede, and also of William of Malmesbury, Pope Gregory the Great sent Austin the monk from Rome to convert the Saxons, and instruct them in ecclesiastical music (A.D. 596); and Bede says, that when the monk and those of his mission had their first audience of King Ethelbert, in the Isle of Thanet, they approached him in procession, singing litanies, &c. This was probably the first time the Anglo-Saxons heard the Gregorian chant.

Mabillon states (Annal. Benedict, vol. iv.), letters were used for notes "in canto fermo" before the ninth century. Agobard, Archbishop of Lyons, collected into one book all the several chants, as they were sung throughout the year in his own church, under the title of "Antiphonarium." This would imply a notation in common use at that time, at least in France, but whether the letters of the Roman alphabet, which St. Gregory is supposed to have first adopted, instead of the endless perplexities of the Greek method, is uncertain. In the MS. of the "Micrologus" of Guido, written two centuries later, alphabetic notes are used, but explained by Gregorian notes. (Burney, vol. 2, p. 32.)

MINSTRELS AND MINSTRELSY.

Minstrels and minstrelsy are closely connected with the early history and progress of music in England. An immense deal has been written and printed about minstrels, but there is much uncertainty as to their origin, and great controversy among the authorities as to their early status and proceedings. Even the word "minstrel" is interpreted to mean various callings other than those of music. By some authors it is asserted that the founder of the ancient Priory of St. Bartholomew the Great, near Smithfield, was a minstrel. His name was Rahere or Raherus. In the "Essay on the Ancient Minstrelsy in England," by William Chappell, it is so stated. But the only ground for this supposition seems to be that previous to Rahere becoming a monk he had belonged to the court, was constantly near the King's person, was of a gay disposition, and addicted to folly and dissipation. Some considerable time after his death the monks of the priory wrote legendary chronicles of his early life and history, in which they set forth his vices in great contrast to his after holiness. (See Dugdale's "Monasticon Anglicanum.")

The county palatine of Chester seems to have been, from a very early period, famous for minstrels, more so than any other part of England.

In a general history of music, by Sir John Hawkins, there are copious accounts of the ancient minstrels, particularly those of Cheshire; and in Lyson's "Magna Britannia" (vol. iii., p. 523), will be found also a long and similar account.

In the "Essay on Ancient Minstrelsy in England," by Mr. Chappell, before quoted, at page 8, occurs the following:—"In the reign of Henry II., in the year 1180, a harper named Galfrid or Jeffrey (*Galfridus Citharœdus*), received an annuity from the Abbey of Hide, near Winchester" (Madox—"History of the Exchequer," p. 251). In the reign of Henry III. forty shillings and a pipe of wine were given to Richard, harper to the King, as also one pipe of wine to Beatrice his wife (Chappell, p. 8).

Giraldus Cambrensis, who flourished in the 12th century, says that the Angles, beyond the Humber, and in the neighbourhood of York, sing in symphonious harmony, &c. By long usage this custom is, as it were, converted into their nature. (Descriptio Cambriæ, cap. xiii.)

In Exeter Cathedral there is a minstrels' gallery, on the front of which are sculptured twelve figures of angels playing on various instruments. The instruments represented are the lute, bagpipe, clarion, rebec, psaltery, sistrum, sackbut, regals, gittern, shalm, timbrel, and cymbals. The date is probably the early part of Edward the Third's reign, A.D. 1330. Britton says, in his history of the Cathedral, and in reference to this gallery, "We may presume that a band of musicians was stationed here on extraordinary occasions of sacerdotal pomp and minstrelsy. The design and character of the sculpture, and the forms of the different instruments, may be referred to Edward the Third's reign." A cast of this singular and rare example of ancient art may be seen in the South Kensington Museum.

The following extract is from the Harleian MS., No. 782:—

Household Book of Edward III., from the 18th to the 21st year of his reign.

Mynstrelles	25
Trompettes	5
Citolers	1
Pipers	5
Taberett	1
Clarions	2
Makerers	1
Waytes	3

Rates of wages in tyme of warre by the daie:—

Mynstrelles, every man by the daye......... 12d.

Anno 21 Edward III., in tyme of peace:—

Mynstrelles { 19, every man by yere......... 20s.
3 waytes, every man by yere 20s.

In the *Archæologia*, vol. xx., there is an article on the translation of a French Metrical History of the deposition of King Richard the Second (1399), a manuscript preserved in the British Museum, and in a footnote at page 22 is the following:—"The popular notion of a minstrel is attached, perhaps, too exclusively to the harp and the banquet. A minstrel was a performer on any instrument then in use, of wind or string. (Du Cange, *Gloss.*) It seems that upon some occasions they formed part of the military band. They are often spoken of . . . . in connexion with the trumpets (Froissart). Edward the Third took them to sea with him when he went to fight the Spaniards (Froissart)."

And in the same article, page 155,—"It (the Duke of Lancaster's host) was marvellously great, and showed such joy and satisfaction that the sound and bruit of their instruments, horns, buisines (a wind instrument made of metal—'*Ces buisines d'arein resonent*'), and trumpets were heard, &c."

In Rymer's "*Fœdera*," vol. vii., p. 555, is the following:—

A.D. 1387, 10 Richard II.

De Conductu pro Rege Ministrallorum.

Writ of safe conduct for Johannes Caumz, *Rex Ministrallorum nostrorum* qui versus diversas partes transmarinas transire proponit, &c. In cujus, &c., per unum annum duraturas. Dated at Westminster, 2nd May.

"*Fœdera*" (Holmes), *tom.* 4, *part* 2, *p.* 126.

3 Henry V., A.D. 1415.

Pro Ministrallis.

A writ of indenture, dated 5th June, the 3rd year of the reign of Henry 5th, witnessing that "John Clyff, Ministral et autres xvij Ministralls ont resceeuz de nostre dit seigneur le Roy, par le mayns de Thomas Count d'Arundell and de Surrie Tresorer d'Engleterre, xl. l. s. sur lour gages, a chacun de ceux xij d. le jour pur demy Quarter de l'an." All which is "pleinement appuert."

"*Fœdera,*" *Vol. X., p.* 287. *A.D.* 1423, 1 *Hen. VI.*

Pro Ministrallis Regis.

Letters Patent, dated at Westminster 14 May, granting to *Willielmus Langton*, one of the late *King's minstrels*, 100 shillings annually, to be paid out of the Exchequer in two equal portions, at Michaelmas and Easter. Similar letters patent, under the same date, granting to ten persons, named Marsham, Snathe, Haliday, Halyday, Pannell, Payte, Bradstrete, Chatterton, and Wilde, minstrels of the late King, 100 shillings a year to be paid out of the Exchequer, &c.

In Burney's *General History of Music*, vol. 2, p. 428, occurs the following:—"In the annual account roll of the Augustine Priory of Bicester, in Oxfordshire, for the year 1431, entries are made of the sums expended in fees to minstrels: "Given to the harper on St. Jerome's day, viii d. To another, called Hendy, at the feast of St. Simon and St. Jude, xij d. To the minstrels of Lord Strange, on Twelfth-day, xx d. To two of Lord Lovell's minstrells, after St. Mark's day, xvj d. To the minstrels of the Duke of Gloucester, on the feast of the Blessed Virgin, iij s. iiij d."

And in a foot note on the same page, Burney says he is indebted to the Rev. Thomas Warton ("History of English Poetry," vol. i., p. 91,) for the following:—"In the ancient annual rolls of accounts of Winchester College, there are many articles of the same sort, that is, entries of payments to minstrels, chiefly in the reign of Edward the Fourth."

"*Fœdera*," *Vol. XI.*, *p.* 510. *A.D.* 1463, 3 *Edw. IV.*

PRO DOCTORE MUSICÆ.

Letters patent, dated at Pontefract, 12 December, 1463, appointing Thomas Saintviste, *Doctor of Music*, Master of "the Kynges Halle," Cambridge, during his life, &c.

Anthony Wood (Hist. Acad. Oxon. lib. 1, p. 245) says that the degree of Doctor in the Faculty of Music was first given in the reign of Henry the Second. "But," says Burney (vol. ii., p. 401-2), "this is fixing it at an earlier period than that in which such a title can be proved to have subsisted at Oxford or Cambridge, or to have been conferred on the professors of other sciences. Spelman, a more nice and accurate sifter of facts, believes that the appellation of Doctor (of music) was not among the degrees granted to graduates in England till the reign of King John, about 1207. It is known that this title was created on the continent about the middle of the 12th century, as more honourable than that of master, which was become too common. Its original signification implied not only learning and skill, but abilities to teach, according to the opinion of Aristotle, who says that the most certain proof of knowledge in any science is the being able to instruct others."

According to Burney, the first degree of this kind which was conferred in a public school or academy, was at Bologna, about the year 1130, where, according to Bayle (Dict. Art. *Irnerius*), it was an honour instituted in favour of Irnerius, chancellor to the Emperor Lotharius, who was created Doctor of Civil Law. During the middle ages music was always ranked among the seven liberal arts; it was included in the *Trivium* and *Quadrivium*, and studied by all those who aspired at reputation for learning throughout Europe. The *Trivium* comprised the three sciences of grammar, rhetoric, and logic, which teach us how to reason with accuracy and precision; and the *Quadrivium* comprehended arithmetic, music, geometry, and astronomy, as the four branches of the mathematics which silently contemplate whatever is capable of being numbered or measured.

By the statutes of the University of Oxford it is required of every proceeder to the degree of Bachelor in Music, that he employ seven years in the study or practice of that faculty, and at the end of that term produce a testimonial of his having so done, under the hands of credible witnesses; and that previous to the supplication of his grace towards this degree, he compose a song of five parts, and perform the same publicly in the music-school, with vocal and instrumental music, first causing to be affixed on each of the doors of the great gate of the schools a programme, giving three days' notice of the day and hour of each performance. Of a bachelor proceeding to the degree of Doctor, it is required that he shall study five years after the taking his bachelor's degree, and produce the like proof of his having so done as is requisite in the case of a bachelor: and, further, shall compose a song in six or eight parts, and publicly perform the same, *tam vocibus quam instrumentis etiam musicis*, on some day to be appointed for that purpose, previously notifying the day and hour of performance in the manner before described; such exercise to be performed in the presence of Dr. Heyther's professor of music. This being done, the candidate shall supplicate for his grace in the Convocation house, which being granted by both the Savilian professors, or by some master of arts deputed by them for that purpose, he shall be presented to his degree.

It is observed by the authors of the "Histoire Litteraire de la France," vol vii., p. 142, and vol. ix., p. 200), that in the semi-barbarous ages music was in such high estimation that no one could omit the study of it who cultivated letters. The learned Gerbert, who arrived at the Pontificate by the title of Sylvester the Second, and many other illustrious personages, regarded it as the second branch of mathematics. But if music does no honour to the sciences at present, it is little indebted to them for the distinction of being admitted into their company during so many ages, as ignorant artists of talent and sensibility have perhaps contributed more to her perfection than all the sublime reveries and profound calculations of men of science. The first qualification for the degree of either bachelor or doctor in music was formerly the reading and expounding certain books in Boethius, as the only writings whence knowledge in the principles of the science could be acquired. But the candidate for academical degrees is no longer put to this test, he is now to compose an exercise for voices and instruments in six or eight parts, which he is to submit to the inspection of the music professor, and to have publicly performed in the music school of the University. Wood, in his "Fasti," has been able to produce no names of musicians that have been enrolled among the graduates of the University of Oxford before the sixteenth century, though we are told of several at Cambridge of an earlier period. Whether Hambois was a member of this University or of Oxford does not appear, nor indeed is it precisely known at what time he received his diploma. In Hollingshed's Chronicle, vol. ii., p. 1355, there is an enumeration of the most eminent men of learning in the reign of Edward the Fourth, among whom the author includes John Hamboys, "an excellent musician," adding that "for his notable cunning therein, he was made a Doctor of Music." But academical honours in the faculty of music may be traced up to the year 1463, when Henry Habengton was admitted to the degree of Bachelor of Music at Cambridge, and Thomas Saintwix, Doctor in Music, was made Master of King's College in the same University (Burney, vol. ii., p. 403-5).

"*Fœdera*," *Vol. XI.*, *p.* 512. *A.D.* 1463, 3 *Edw. IV.*

PRO MARESCALLO MINISTRALLORUM.

Letters patent, granting to Walter Haliday, "Marescallo Ministrallorum Nostrorum," ten marks a year for his life. Dated at Northampton, 19 January.

In the reign of Edward the Fourth, says Burney, music, after "long living a vagrant life, and being passed from parish to parish, seems at length, by the favour of this monarch, to have acquired a settlement," for it appears that by his letters patent, under the Great Seal of his realm of England, bearing date the 24th of April, 1469, in the ninth year of his reign, upon a complaint that certain rude husbandmen and artificers of various trades had assumed the title and livery of the king's minstrels, and under that order and pretence had collected money in divers parts of the kingdom, and committed other disorders, the king grants to Walter Haliday (marshal), John Cliffe, Robert Marshall, Thomas Gréne, Thomas Calthorn, William Cliff, William Cristean, and William Eynesham, his own minstrels, a charter, by which he creates (or rather restores) a fraternity or perpetual guild (such as the brothers and sisters of the fraternity of minstrels had in times past) to be governed by a marshal appointed for life, and by two wardens (*custodes*) to be chosen annually, who are empowered to admit brothers and sisters into the said guild, and are authorised to examine the pretensions of all such as affected to exercise the minstrel profession (*artis sive occupationis ministrallorum*) and to regulate, punish, &c., throughout the realm (those of Chester excepted).

This charter of the 9th of Edward the Fourth (A.D. 1469) is printed in extenso in the *Fœdera*, vol. xi., p. 642. It is headed "Pro fraternitate ministrallorum Regis." When Charles the First, in the 11th year of his reign, was petitioned to grant a new patent to the professors of the art and science of music, the form of the above charter of Edward the Fourth was made the ground-work of the new one. (Burney, vol. 2, p. 430.)

In the *Liber Niger Domus Regis* (see Harleian MSS., No. 293, and Nos. 1147, 2, 3, 11, of the Ashmolean Collection, Oxford, for "Ordinances touching the King's Household, Temp. Ed. II. and Edw. IV.), which is an account of the household establishment of Edward the Fourth, there is mention made of the musicians in his service, as well as those for his private amusement (*propter solatium regis*), and those for the service of his chapel. "This," says Burney, "seems the origin of the Chapel Royal and King's Band."

The following extract from the *Liber Niger* is printed in Burney, vol. 2, p. 430, but the spelling I have modernised:—"MINSTRELS thirteen, whereof one is verger, which directeth them all festival days in their stations of blowings and pipings to such offices as the officers might be warned to prepare for the king's meats and suppers; to be more readier in all services and due time; and all these sitting in the hall together, whereof some be trumpets, some with the 'shalmes' and small pipes, and some are strange men coming to this court at five feasts of the year, and then take their wages of household, after fourpence halfpenny by day, after as they have been present in court, and then to avoid after the next morrow after the feast, besides their other rewards yearly in the king's exchequer, and clothing with the household, winter and summer, for each of them 20s. And they take nightly amongst them all four gallons ale; and for winter season three candles wax, six candles pitch, four talesheids (billets for fire-wood), lodging sufficient by the 'herbengere' for them and their horses nightly to the court. Also having into court two servants to bear their trumpets, pipes, and other instruments, and torch for winter nights, whilst they blow to supper of the 'chaundry;' and always two of these persons to continue still in court, at wages by the cheque-roll whilst they be present, 'iiij ob.' (? 4 pence) daily, to warn the king's riding household when he goeth to horseback as oft as it shall require, and that his household many may follow the more readier after by the blowing of their trumpets. If any of these two minstrels be let blood in court, he taketh two loaves, two mess of great meat, one gallon ale. They part not at no time with the rewards given to the household. Also when it pleaseth the king to have two minstrels continuing at court, they will not in no wise that these minstrels be so familiar as to ask rewards.

"A 'WAYTE' that nightly from Michaelmas to Shrove Tuesday pipeth watch within this court four times; in the summer nights three times, and maketh 'Bon Gayte' (*good watch*, from the French, *Bon guet chasse malaventure*), at every chamber-door and office as well for fear of 'pyckeres and pillers.' He eateth in the hall with minstrels, and taketh livery at night a loaf, a gallon of ale, and for summer nights, two candles pitch, a bushel of coals; and for winter nights, half a loaf of bread, a gallon of ale, four candles pitch, a bushel coals daily whilst he is present in court for his wages in cheque roll, allowed 'iiij d. ob, or else iij d.' by the discretion of the steward and treasurer, and that after his coming and deserving; also clothing with the household yeomen or minstrels, like to the wages that he taketh; and be he sick he taketh two loaves, two mess of great meat, one gallon ale. Also he parteth with the household of general gifts, and hath his bedding carried by the comptrollers assignment; and under this yeoman to be a 'groome watere.' If he can excuse the yeoman in his absence, then he taketh reward, clothing, meat, and all things like to other grooms of household. Also this 'Yeoman-Waighte,' at the making of Knights of the Bath, for his attendance upon them by night time, in watching in the chapel, hath to his fee all the watching clothing that the knight shall wear upon him.

"CHILDREN OF THE CHAPELLE viij, found by the King's privy coffers for all that belongeth to their apparel by the hands and oversight of the Dean, or by the Master of Song assigned to teach them, which master is appointed by the dean chosing one of the number of the fellowship of chapel after rehearsed, and to draw them to other schools after the form of 'Sacotte,' as well as in song, in organs and other. These children eat in the hall daily at the chapel board, next the yeomen of 'Uestery;' taking amongst them for livery daily for breakfast and all night, two loaves, one mess of great meat, two gallons ale; and for winter season, four candles pitch, three 'talshieds' (billets of wood), and litter for their pallets of the sergeant-usher, and carriage of the King's cost, for the competent bedding by the oversight of the comptroller. And amongst them all to have one servant into the court to truss and bear their harness and livery in Court. And that day the King's Chapel removeth every of these children then present receiveth fourpence, at the green cloth of the counting-house for horse hire daily as long as they be journeying. And when any of these children come to 18 years of age, and their voices change, nor cannot be preferred in this chapel, the number being full, then if they will assent the King assigneth them to a college of Oxford or Cambridge of his foundation, there to be at finding and study both sufficiently, till the king may otherwise advance them."

"*Fœdera*," *Vol. XIII., fo.* 705. *A.D.* 1520, 11 *Hen. VIII.*

DE CONFIRMATIONE PRO MINISTRALLIS.

Letters patent, dated at Westminster 23rd January, confirming in their office and privileges certain king's minstrels (named) with their marshal, &c.

"*Fœdera*" (HOLMES), *tom.* 6, *part* 2, *fo.* 115. *A.D.* 1529,
21 *Henry VIII.*

PRO MARESCALLO MINISTRALLORUM.

Letters patent, dated at Westminster 8th May, granting to *Hugo Wodehouse* the office of marshal of the minstrels which *Johannes Gylmyn* since had, "*cum vadiis decem marcarum per annum.*"

Archæologia, Vol. III., p. 156, *A.D.* 1530, 22 *Hen. VIII.*
From a MS., dated at Eltham, Jan. 22.

This manuscript is entitled "Articles devised by his Royal Highness with advice of his council for the establishment of good order and reformation of sundry errors and misuses in his household and chambers."

Cap. 34. No herald, minstrel, falconer, or other shall bring to the court any boy or rascal.

Page 70. Eighteen minstrels are appointed at 4d. a-day each, by their names mostly Italians.

"*Fœdera*" (HOLMES), *Vol. VI., part* 3, *fo.* 42. *A.D.* 1540,
31 *Hen. VIII.*

DE CONCESSIONE AD VITAM PRO FRATRIBUS IN ARTE MUSICA.

Letters patent, dated at Westminster 14th April, 1540, granting annual stipends to *Alinxus*, *Johannes*, *Anthonius*, *Jasper*, *et Baptista de Basam*, "*Fratres in scientia sive arte Musica.*"

The stipends are to Alinxus £50 per annum; to Johannes 2s. 4d. a day; to the others 20d. a-day. To be paid out of the exchequer.

"*Fœdera*" (HOLMES), *vol.* 6, *part* 3, *fo.* 60. *A.D.* 1540, 32 *Henry VIII.*

Letters patent, granting to Willielmus Diemvat, "*unus ludatorum nostrorum super instrumenta musica*," an annual stipend of £38, payable out of the exchequer. Dated at Westminster 26th September.

Henry VIII.'s Scheme of Bishopricks provided that in each cathedral there should be a stated number of petty canons, laymen, and choristers, whose annual stipends were specified.

Thus in Canterbury there were eight peticanons to sing in the quere, every of them x *li.* by the yere:—xii. laye men to sing also and serve in the quere, every of them vi *li.* xiii*s.* and iii *jd.* by the yere: also x. choristers every of them v. marks by the yere.

Rochester had 6 pety canons: vi. laye men and viii. choristers. Worcester, x. peticanons: viii. laymen: & xii. choristers: & so on.

"Certain articles noted for the reformation of the 'Cathedrall churche of Excester,' provided amongst other things 'That ther may be in the said Cathedral Churche a free songe scole the scolemaster to have yerly of the said pastor and prechars xx. marks for his wages and his howsee free, to teach xl. children to rede, to write, synge, and *playe upon instruments of musike*, also to teche ther A B C in greke and hebrew.' These children were to sing and rede in the Cathedral Church, and three priests were appointed to see them well ordered at the meat and 'to reforme their maners.'"

Henry Dowes, the tutor of Thomas Cromwell's son, writes to say that he instructs his pupil "with good letters, honeste maners, *pastyme of instruments*." He says, "Laste somer was spent in the servyce of the wylde goddes Diana, this shall I truste be consecrated to Apollo and the Muses;" and speaking of the studies of the day, he says, after translating Erasmus, "he exerciseth his hande in writinge one or two houres and redith uppon Fabian's chronicle as longe; the residue of the day he doth spende upon the *lute and virginall*." (See Henry VIII.'s "Schemes of Bishopricks," edited by H. Cole. London, 8vo., 1838.)

(*To be continued.*)

THE PARIS CONSERVATOIRE OF MUSIC.

The annual examinations of the pupils of the French School of Music take place this month; and the following account of the mode in which these examinations are conducted, being from the pen of M. A. Elevart, the professor of vocal harmony in the Conservatoire, will therefore not be ill-timed:—

The examinations are divided into two series, those which are held with closed doors, and those which are open to the public, or to such of the public as can obtain tickets of admission, which on some days are as scarce as tickets for a coronation, in fact, are utterly unattainable by ordinary mortals. The private examinations include sol-fa, written harmony, thorough bass, the adaptation to the piano of a piece from an old opera; scales, organ, contrebasse, contrepoint, and fugue. This portion of the competition is carried on in the small theatre of the Conservatoire, while the public trials take place in the concert theatre; the latter include singing, grand opera and comic opera, violin, violoncello, harp, piano, and all the wind instruments played by pupils, whether civil or military, for since the suppression of the gymnasium of military music, the Conservatoire has the charge of the education of military musicians. The examination of the pupils in the dramatic classes usually terminates the public examinations. The president of the juries is M. Auber, the director of the Conservatoire. The juries themselves are nine in number; five of these consist of professors of the Conservatoire, while the other four are selected from the artistic celebrities of the capital.

The pupils in sol-fa are required to execute at sight what is called a lesson *à changements de clefs*, and M. Elevart explains this in the following terms:—"This name is given to a particular system of notation which introduces the seven positions of the three keys in an arbitrary manner, so as to test the promptitude of eye possessed by the competing pupils."

The pupils of the class of harmony have to arrange a selected piece with bass, and the fugue class to compose a fugue on a given subject; for this purpose eighteen hours are allotted, during which time the pupils are shut up in the class-rooms of the Conservatoire; the successful pupils rarely take more than eight or ten hours to complete their tasks. The other pupils, whether vocal or instrumental, have to execute a piece selected by the committee of studies; each kind of instrumentalist executes the same piece, and all, except the vocalists, have to execute a manuscript piece at sight.

Formerly there were vocal classes in the Conservatoire which competed in public. After having sung a morceau chosen by their professors, the pupils sang a manuscript piece at sight. M. Elevart regrets that this kind of vocal counterpoint has fallen into disuse in the singing classes, "as the study of vocalization and the obligation of executing at sight in public forced the singers to be musicians, that is to say, readers."

Each pupil of the singing classes admitted to the competition sings a piece chosen by the professor. There are certain airs which are repeated ten times during one day's exhibition. The air of the *Deux familles* of Theodore Labarre and that of *Norma* have often been in this position.

The public competitions occupy a whole week. They commence at nine in the morning and terminate ordinarily at about four in the afternoon. The most popular of the musical classes are those of the violin and piano, and serious and comic opera. The scenes of tragedy and comedy performed by the pupils of the declamation classes attract a special audience.

With the exception of the pit and gallery, which are nominally open to the public, admission can only be obtained by means of tickets signed by the director. These tickets are distributed amongst the ministry of Fine Arts, the directors of the Imperial theatres of Paris, and the professors of the Conservatoire. At the public distribution of prizes each prize pupil receives one or two tickets, according to the degree of the prize which he or she may have obtained. At present the distribution takes place in August, a few days after the closing of the competitive examinations, but formerly it took place in November, after the reopening of the classes, which are closed from the first of August to the end of September. At that time the meeting was a very interesting one; the time was sufficient to allow of the music to be performed on the occasion being well studied; the accompaniments were given by a full band, and it was usual for the pupil who had gained the first prize in fugue in the preceding year to write the overture of the concert. At present the full band is replaced by a simple piano, and the first prizeman of the fugue class has no longer the opportunity of testing his powers in presence of a select public. The old practice of a symphony, composed for all instruments, and executed by the laureats of the year has also necessarily fallen with the abolition of the orchestra. These melodies used to be written by eminent composers, and the names of François Bazin, Jules Cohen, and Coradin Prumier are remembered with pleasure by habitués of the Conservatoire meetings.

THE ABATTOIRS OF PARIS.

Whatever question there may be about the policy of certain demolitions and changes made in streets, boulevards, and promenades, all the world agrees in applauding the efforts made by the authorities—of great cities especially—towards the improvement of the sanitary condition of the inhabitants. The Thames Embankment; the new systems of sewerage of Paris and

London; the destruction of wretched alleys, the formation of wide streets, squares, places, and plantations, are among the greatest material benefits that have been conferred by those governments and authorities on the population at large.

The system of markets and slaughter-houses forms a most important branch of civic economy, and in this matter Paris is certainly far ahead of London; the principle of compelling so disagreeable a business as that of the slaughtering of cattle to be carried on without the walls or limits of cities, has been in practical operation in Paris for half a century. The extension of the city itself has, however, broken the rule, and the old abattoirs, or the sites on which they stood—for one or more have already been demolished—are now within the municipal enclosure. In order to meet this the city authorities are forming one immense cattle market and abattoir for the whole of Paris at Villette, an outskirt of the city, near the Northern Railway, and admirably situated as regards means of conveyance, the site being not only in close proximity to the railway in question, and with the circular railway which connects that and all the other great railways terminating in Paris, but also to the canals of the Ourcq and of St. Denis. There is no public work, except, perhaps, the great central Halles, or market, which is of such importance in a sanitary point of view as this new cattle market and abattoir. The abattoirs themselves will occupy a space of 250,000 square metres, and will, in fact, form a small town, intersected by wide streets, with a boulevard or outer street, more than sixty feet in width, and all planted with streets like the great thoroughfares of the city.

There will be no less than sixty-four slaughter-houses or abattoirs, one-half of which are now completed as far as their outer walls, and are being roofed in. The offices to be occupied by the octroi and the other officials are partly ready, and all will shortly be completed. An immense melting house, or rather series of melting-houses, octagonal buildings with projecting wings, are now being erected, so that the tallow as well as the meat will leave the abattoir in a convenient shape for being transported and manufactured.

Close to the new abattoirs will be the great cattle market, which in a very short time will supersede those of Poissy and Sceaux. The two establishments taken together will certainly form one of the most important public works in Europe.

GUN COTTON FOR SMALL ARMS.

Gun cotton, though largely used for blasting purposes in this country, has hitherto, in its employment as an explosive material in guns, not been so satisfactory as could be wished. Important progress has however been made in the practical application of gun-cotton since its study was resumed in this country about three years ago. Very large quantities of this material have been manufactured at the works of Messrs. Prentice, at Stowmarket, as well as at the Government gunpowder works at Waltham Abbey. Its application to mining and artillery purposes and also to small arms has been and still is the subject of systematic experiments conducted by the Government Committee on Gun Cotton. Its employment as a blasting agent is steadily increasing in several important mining districts in England, and a considerable, though not uniform, success has attended the employment of gun-cotton for sporting purposes.

In the early applications of this material, after Schönbein's discovery of it, great difficulty arose in its use, from the want of uniformity in its quality as well as from the absence of controlling power over its action as an explosive compound. It was found, as originally manufactured, that it was a very unstable compound, decomposing readily, and thus becoming liable to spontaneous ignition. Its true chemical composition was subsequently laid down by Hadow, and further investigations have confirmed his views; and we have been enabled, through the researches of General von Lenk, in Austria, and the valuable labours of Mr. Abel, in England, to get rid of many if not all the difficulties, and by an improved system of manufacture, carefully conducted, to produce an article which experience shows to be uniform in its character, and not liable to decomposition or spontaneous ignition. The most explosive gun-cotton is perfectly insoluble in mixtures of ether and alcohol, but by varying the proportions and strength of the acids employed for the conversion of the cotton, products of a less explosive character are obtained, which are more or less soluble in ether and alcohol (forming the well known photographic vehicle, collodion). It appears that the imperfections in the manufacture of gun cotton arise from the introduction of foreign matters in the cotton, which can, however, be almost entirely got rid of, and, at all events, so small an amount is left as to produce no practical inconvenience. The rapidity of its combustion makes it valuable as an explosive agent for blasting, but this very property renders it in its pure form useless as a propelling agent for a projectile, where a regulated rate of combustion is required, generating an explosive force which gradually expels the bullet from the piece. The rapidity with which gun-cotton burns in the open air admits of ready and very considerable variation by applying the simple expedients of winding, twisting, or plaiting gun-cotton yarn of different sizes; but although a mass of gun-cotton may be made to burn in a comparatively gradual manner by being very tightly wound, a charge of the material in that form acts quite as destructively when in the bore of a gun as an equal charge consisting of the yarn wound, since the pressure of the gas established by the first ignition of the charge renders the close packing of the gun-cotton powerless to resist the instantaneous penetration of the flame between the separate layers of the material. This method of controlling, though asserted in the early days to be effectual, has turned out to be inefficient. Several methods, however, have been tried. The one adopted by Messrs. Prentice consists of forming cartridges of the gun cotton diluted (so to speak) with cotton it its original form; and cartridges of this material have been constructed for sporting purposes, which give results that are stated to be very promising. Mr. Abel's method consists in controlling the action of the gun-cotton by consolidating the material by pressure into compact homogeneous masses, and in confining the first ignition of such compressed gun-cotton in the bore of the gun to certain surfaces. Mr. Abel accomplishes this by reducing the gun-cotton fibre to a fine state of division or pulp, as in the process of paper making, and converting this pulp into solid masses of any suitable form and density. This method of operating affords special facilities for combining both methods—dilution and compression—of reducing the explosive violence of the gun-cotton, and the results hitherto attained are very encouraging. A systematic course of experiments is now in progress, with the object of preparing the material for artillery purposes. A third method has been adopted by Mr. Dixon, who, instead of preparing his explosive material in the form of cotton, or cotton wool, and then dealing with the material by weaving, twisting, or plaiting, combined with some diluting agent, takes the woven material in the first instance and treats this with the combined acids of the proper strength, at the suitable temperature, subsequently washing the material in running water for a lengthened period, as in the most approved methods of making gun-cotton. Strips of this material, which the inventor terms gun-cloth, of suitable width and length, are then loosely rolled with thin tissue paper between the layers, thus accomplishing the dilution necessary for reducing the rapidity and violence of the explosion, and rendering the material suitable for the expulsion of the bullet. This roll is dropped loosely fitting into a cartridge, and is thus adapted for the rifle or for general sporting purposes. Mr. Dixon, it is stated, uses also a silica solution for further diluting the gun-cotton if required, and by varying the breadth and length of the tissue paper, he is enabled to modify the rate of explosion at different portions of the cartridge, adapting it in such a way as to render it most effective for the expulsion of the bullet. Some interesting experiments with these cartridges took place a few days since at Messrs. Bussey's factory in Holborn, with excellent results. Mr. Dixon states that by using the gun-cloth he attains a greater regularity and uniformity of manufacture, and by his method of rolling it combined with the tissue-paper he obtains, by a simple, easy, and inexpensive process, a perfect means of regulating and adapting the discharge to the purpose for which it is required. As compared with gunpowder the gun-cloth cartridge for equal effect weighs one-third that of the powder. It may be dipped and thoroughly soaked in water, and after drying may be used immediately with unimpaired effect. This remark of course applies as well to other forms of gun-cotton. The experiment was tried at Messrs. Bussey's, and a cartridge having been soaked was dried and fired within three minutes.

Looking at the progress which has been already made in the manufacture and treatment of this material in the hands of Mr. Abel, aided by the elaborate series of experiments conducted and going on under his superintendence, as well as to the practical intelligence of Messrs. Prentice and Mr. Dixon and others, there is no reason to doubt that the application of gun-cotton with great advantage to some of the more important purposes for which gunpowder is used, will, ere long, be fully established.

Fine Arts.

Stained Glass.—Count de Neuwerkerke, the Superintendent of Fine Arts, has ordered the collection of stained glass belonging to the Louvre to be placed in the windows of the gallery, or rather of the rooms known as the chambers of Henry II. and Henry IV., and the vestibule adjoining. The collection of the Louvre comprises those made by MM. Durand and Révoil, enriched by additions from the famous gallery of Sauvageot. The expressed intention of the superintendent is that these specimens of painted glass should be exhibited exactly as drawings are, and he has therefore rejected all decorative arrangement, as tending to add to these fragments which time has spared something which did not belong to them, and which might have given rise to confusion and error. The specimens will, as far as possible, be arranged in the order of their dates, and the collection, when completed, will exhibit an unbroken series of specimens of the art from the time of Louis XII. to that of Louis XIV.

Exhibition of the Works of Deceased Artists.—A *brochure* has appeared in Paris, under the title of *Les Expositions Posthumes*, in which the author, M. Maret Leriche, complains that the reputations of great artists are placed in danger by collective exhibitions of their works too soon after their death, before partizanship and hostility have had time to cool down. The plan proposed by the writer is that the Government should from time to time, say every ten years, add a posthumous gallery to those of the annual exhibitions of living artists.

Commerce.

The Porter Trade of Dublin.—The immense growth of the trade in malt liquors in Ireland is evidenced in the increasing exports from Dublin. The shipments have risen from 86,735 hhds. in 1854, to 229,674 hhds. in 1865, quite irrespective of the home consumption, which is now very considerable. Messrs. Guinness and Co. alone ship as much as all the other eight Dublin brewers combined. Last year 200,000 barrels of malt were consumed in this brewery, all of which was grown in Ireland, and allowing a yield of say 15 barrels per statute acre, this must have been the produce of more than thirteen thousand acres of land. The comparative size of this brewery contrasts very favourably with that of similar concerns in England and elsewhere. From an official return of 1840, the quantity of malt stated above was only then reached by one brewery in England, that of Messrs. Barclay. At that period the consumption of Messrs. Guinness did not greatly exceed a fourth of its present quantity; while it appears from the malt duty returns of last year that there are only four brewers in England who now reach more than 200,000 barrels, and that the largest of these does not exceed 300,000 barrels in their yearly brewings. With respect to the breweries of other countries, the largest on the continent, that of M. Driker, of Vienna, does not brew more than 100,000 barrels of malt per annum. The fermenting tuns in Guinness's brewery, square oaken vessels, eight in number, are of very large capacity, some of them holding 1,100 hogsheads. The vats are nearly 100 in number; many of them hold 3,000 barrels, being about 26 feet in depth and 29 feet in diameter; the enormous number of casks required for the trade may be realised from the statement that the stock is about 125,000, and that the arrangements for cleansing by machinery are such that 6,000 casks can be turned out in twenty-four hours. One hundred coopers are kept constantly employed making casks, and there are 500 workmen in all employed. The consumption of coal averages 150 tons per week, and the quantity of water, used either for brewing or cleansing purposes, is about 400,000 gallons daily. The number of brewers in Ireland in 1864 was 95, and of victuallers 15,578, and the quantity of malt they wetted 316,974 quarters. In comparison with the year 1843 there are 63 brewers less, 2,652 victuallers more, and an increase of 190,717 quarters in the consumption of malt.

The Beet Crop in France.—On this subject *Le Journal des Fabricants de Sucre* says:—"Two scourges threaten the beetroot crop—the white worm and the want of labour. In several localities this formidable insect has commenced its ravages; whilst in a radius extending from the Aisne, the Somme, and even from the Oise, they cannot, for want of labourers, succeed in redressing the plant at an opportune season, or free it from the weeds that choke it. This may be very satisfactory to the enemies of the precious root, but let them not prematurely rejoice. The evil we notice is limited, and the white worms, however numerous and voracious they may be, cannot devour the whole crop, favoured as it is by this long week of rain, which has enabled it to put forth its leaves, and the better to support the summer heat; in short, the general appearance of the crop is satisfactory, and we may still adhere to our former estimate of the result, which, although it will be considerably less than that of last year, will in all probability be a fair one."

The Cotton Trade.—The total quantity of cotton imported into the United Kingdom in 1856 was 1,023,886,304 lbs.; in 1857, 969,318,896 lbs.; in 1858, 1,034,342,176 lbs.; in 1859, 1,225,989,072 lbs.; in 1860, 1,390,938,752 lbs.; in 1861, 1,256,984,736 lbs.; in 1862, 523,973,296 lbs.; in 1863, 669,583,264 lbs.; in 1864, 893,304,720 lbs.; and in 1865, 977,978,288 lbs. In consequence of the great and general reduction of the European stocks of cotton, the exports of cotton from the United Kingdom have very greatly increased of late, having been 146,660,864 lbs. in 1856; 131,927,600 lbs. in 1857; 149,609,600 lbs. in 1858; 174,143,136 lbs. in 1859; 250,339,040 lbs. in 1860; 298,287,920 lbs. in 1861; 214,714,528 lbs. in 1862; 241,352,496 lbs. in 1863; 214,702,304 lbs. in 1864; and 302,908,928 lbs. in 1865. The excess of the imports of cotton was thus:—877,225,440 lbs. in 1856; 837,391,296 lbs. in 1857; 884,732,576 lbs. in 1858; 1,050,845,936 lbs. in 1859;

1,140,599,712 lbs. in 1860; 958,696,816 lbs. in 1861; 309,258,768 lbs. in 1862; 428,230,768 lbs. in 1863; 648,602,716 lbs. in 1864; and 675,069,360 lbs. in 1865. It was a small increase last year in the quantity of cotton available for British consumption which enabled prices to be so well maintained after the termination of the American war. Thus in 1859 cotton averaged 6·76d. per lb.; in 1860, 7·17d. per lb.; in 1861, 7·39d. per lb.; in 1862, 14·24d. per lb.; in 1863, 21·97d. per lb.; in 1864, 21·01d. per lb.; and in 1865, 16·20d. per lb.

Imports from British India.—The entire value of the imports into the United Kingdom from British India, exclusive of Ceylon and Singapore, amounted last year in round numbers to thirty-seven and a-half millions sterling. Compared, however, with the figures for 1864, a falling off is apparent of very nearly fifteen millions. This decrease has arisen in a great measure from diminished supplies and depreciation in the price of raw cotton; likewise from a considerable reduction in the amount of sugar sent to this country. The latest completed annual statement of the trade between the United Kingdom and British India is that for 1864, from which it appears that in that year the aggregate value amounted to £52,295,599, a sum of a magnitude unparalleled in the import statistical records of this kingdom. Of the total not less than £37,899,651 is set down for cotton; and in illustration of the facility with which the inhabitants of India adapted their resources to the production of that important article of commerce, it may be observed that in the year preceding the outbreak of the civil war in the United States, the value of such imports only slightly exceeded three millions sterling. The other most important items are coffee, gums, jute, hides, indigo, rum, sugar, tea, &c. On reference to the statistical account for the three years preceding it appears that the aggregate import values were as follows:—In 1860 they amounted to fifteen millions; in 1861 to twenty-two millions; and in 1862 to thirty-four millions; so that in the last quinquennial period the increase has been considerably more than three-fold.

Colonies.

Emigration from Great Britain.—The number of emigrants to the Australian colonies last year was 37,283 persons; in 1864, 40,942; in 1863, 53,054. The greatest number recorded was in 1852, 87,881. To the North American colonies the emigration comprised, last year, 17,211; in 1864, 12,721; in 1863, 18,083. The largest emigration was in 1861, 43,761. The emigration to the United States in 1865 was 147,258; in 1864, 147,042; in 1863, 146,813; in 1861, 49,764. The total emigration to all parts in 1865 comprised 209,801; in 1864. 208,900; in 1863, 223,758; in 1862, 121,214; in 1861, 94,770; in 1860, 128,410; in 1859, 120,432; in 1858, 113,972; 1857, 212,875; and in 1856, 176,554.

Emigration to Queensland.—From the report of the Emigration Commission to this colony it appears that during the last ten years the number of emigrants from the United Kingdom has annually decreased. The fifth year of the Queensland emigration under the Land Order System shows a larger number than during any year since its establishment in May, 1861. During the five years that the Land Order System has been established 33,483 have been sent to that colony. The total emigration from Great Britain to Queensland during the last year was 1,152 persons. The assisted emigrants were reduced last year to 688, showing a falling off since last year of 972, and the income amounted only to £10,073 4s. up to 31st March, including the amount of £1 paid by the free passengers. The number of full-paying passengers has been 1,546, nearly an equal number to those despatched in the previous year. In one ship alone the capital taken by the passengers was found to be about thirty thousand pounds, a large portion of it belonging to the intermediate and steerage passengers.

The Angola in Victoria.—The Acclimatization Society of this colony, some three years ago, initiated experiments with a view of testing the worth of the Angola wool, and having become convinced of its value, they proceeded to procure the introduction of the Angola goat, having recently received a ship load of 93 of the best specimens. Within a very few years it is anticipated by many that Angola wool will occupy as important a place in Victoria exports as merino wool does at present. The society has also turned its attention to the ostrich, and has made arrangements to procure a large number of these birds from Cape Colony, it being thought that they will thrive in Victoria as well as in Africa.

Queensland Sugar.—There seems to be some difficulty in the way of manufacturing sugar from the juice of the Queensland-grown canes. Whether the fault is with the operators or the machinery it cannot be said; the juice is reported everywhere to be all right, and no doubt this slight hitch will soon be got over. In the meantime very fair samples are frequently being sent to Brisbane. Persons of some experience state that from what they have seen they believe that the small Otaheitan and ribbon canes are the most suited to the climate of this colony.

Notes.

Preservation of Lemons.—A correspondent of the *Pharmaceutical Journal* (Mr. Mee) writes that lemons may be preserved by the very simple process of varnishing them with a solution of shellac in spirits of wine. Fresh lemon juice is thus obtainable at all seasons of the year; and if the peel be required for flavouring, the skin of shellac may be easily removed by simply kneading the elastic lemon in the hands.

Paris Universal Exhibition.—Regattas on the Seine.—The Imperial Commission state that it is their intention to organise in connection with the exhibition a series of international regattas, Venetian fêtes, &c., and invite the co-operation of England, and especially desire that the Universities of Oxford and Cambridge shall be represented. It is intended to hold these regattas on the Seine, a portion of the quay of which will be connected with the park of the Exhibition. A special building will be erected on the quay for the exhibition of all matters connected with navigation, including marine engines (which, it is proposed, shall be exhibited in motion), life-boats, apparatus for saving life, &c. Small yachts and boats of all kinds will be exhibited on the Seine immediately in front of the quay. A certain space on the quay is offered to England, and our countrymen who may desire to take part in this friendly competition are assured that they will meet rivals worthy of them. Amongst other objects that will be shown there are the marine engines of Indret of 1,000 horse-power, which will be set in motion by steam furnished from their own boilers.

Pisciculture in Norway.—Reports from Norway say that great success has attended pisciculture in that country. The rivers, formerly so full of fish, had, for want of proper regulations concerning fishing, almost ceased to yield any, when it was determined to make an attempt to restock them. The rivers Drammen, Mandol, Christiansand, and Laagen are said to have had 200,000 young salmon turned into their waters, and the fish are thriving in a remarkable degree. The salmon and the sea trout have also been successfully introduced into the lakes of Wettern and Wofferstadt, whence there is no outlet to the sea. Further, it is said that during the last five years, successful attempts have been made to stock lake Soranes, known as the dead lake, because no fish had ever been seen in it. M. Hanson de Stavanger is said to have succeeded in fecundating by artificial means two distinct species of salmon reciprocally. These facts, which have been published by the secretary of the Paris Société d'Acclimatation, are curious, and well deserve the attention of proprietors of lakes and other waters.

Museum of the Antiquities of Paris.—The intended establishment, at the Hôtel de Ville, in Paris, of a museum of the antiquities of the city, has already been mentioned in the *Journal.* The Municipal Council of the Seine has just purchased, in furtherance of that intention, a large collection of drawings, engravings, plants, and medals relating to the history of ancient Paris, of M. Gailhabeaud, for 125,000 francs (£5,000). With such additions as these the Antiquarian Museum of Paris will soon become important.

Correspondence.

Memorial Tablets.—Sir,— I beg to draw the attention of the Tablets' Memorial Committee to the fact, that the keeper of the public-house, at No. 17, Fetter-lane, has placed over his shop front a label inscribed, " Here lived Dryden, the poet."—I am, &c., Alan S. Cole.
South Kensington Museum, July 17, 1866.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. Numb.

Delivered on 11th July, 1866.

209. Bill—Inland Revenue.
366. Vicarages and Curacies—Return.
385. Writs Registration (Scotland) Bill—Report and Minutes of Evidence.
397. General Committee of Elections—Mr. Speaker's Warrant.

Session 1865.

442. (b. i.) Poor Rates and Pauperism—Return (B).

Delivered on 12th July, 1866.

188. (i.) Penal Servitude Act—Return.
369. Electors, &c. (Ireland)—Return.
375. Public Works (Manufacturing Districts) Acts (1863-4)—Report of R. Rawlinson, Esq.
388. Benefices (Metropolis)—Return.

Delivered on 13th July, 1866.

204. Bill—Court of Session (Scotland).
Manufactures, Commerce, &c.—Reports by Her Majesty's Secretaries of Embassy and Legation, No. 15.

Delivered on 14th July, 1866.

207. Bill—Prisons (Ireland).
Births, Deaths, and Marriages (England)—Twenty-seventh Annual Report.
Children's Employment—Fifth Report of Commissioners.

Delivered on 16th July, 1866.

372. Metropolitan Workhouse Infirmaries, &c.—Report of Dr. Smith.
393. Ordnance Survey (Ireland)—Statements.

Delivered on 17th July, 1866.

377. Poor Law Unions (Ireland)—Return.
386. Official Liquidators—Return.
394. Bakehouses Regulation Act—Reports.
398. Army Services (1866-7)—Supplementary Estimate.

Patents.

From Commissioners of Patents' Journal, July 13th.

Grants of Provisional Protection.

Alkaline permanganates, obtaining—1726—C. E. Brooman.
Axle-trees, &c., applying packing to—1699—C. P. Holliss.
Bottle fountains—1652—J. Nadal.
Brackets—1743—M. L. J. Lavater.
Brick-making machines—1739—J. H. Johnson.
Bricks—1754—H. A. Bonneville.
Bricks—1768—A. P. J. Allemand and L. G. Speyser.
Carriages, springs for—1670—T. Whitley.
Carriage windows—1735—J. Imray and J. Ellis.
Coals, screening—1682—W. Poupard.
Complexion, beautifying the—1446—J. Lewenberg.
Connecting links and hooks—1785—A. V. Newton.
Cotton gins—1769—G. F. Starnes.
Cotton gins, saws for—1758—T. C. Craven.
Electric telegraphic machines—1725—F. T. Hubert & H. D. G. Truscott.
Fatty matters, distilling—1778—C. Doughty.
Fibrous materials, treating—1629—J. G. Marshall.
Files, cutting—1715—J. Henshall.
Fishing—1755—G. Frère.
Gas—1348—A. V. Newton.
Glass, cutting—1673—C. de Grelle.
Governors—1777—M. Henry.
Gums, treating—1667—E. Hunt.
Gunpowder, non-explosive, rendering—1721—H. D. Plimsoll.
Hard water, softening—1180—T. W. Tobin.
Horticultural glass houses—1580—J. Cranston.
Human body, applying heat to the—1753—H. A. Bonneville.
Iron ores, smelting—1734—H. Hobson.
Leather—1746—T. F. Gillot.
Leggings, &c., fastenings for—1773—A. Myerns.
Locks—1638—G. H. Hopps.
Locomotive and traction engines—1757—C. J. Appleby.
Locomotive engines and tenders—1781—R. Fowler.
Locomotive traction engines—1728—D. K. Clark.
Lubricating purposes, apparatus for—1759—J. H. Johnson.
Materials, treating—1693—G. Charles-Ange.
Metals, drilling—1729—S. Deacon.
Mineral substances, treating—1350—W. Prosser.
Miner's safety lamps—1610—W. H. Hall and J. Cooke.
Motive power, obtaining—1767—W. Adolph.
Mowing and reaping machines—1738—R. Hornsby.
Printing ink—1737—S. Holmes.
Pulse grain and seeds, decorticating—1724—J. H. Johnson.
Rafts—1660—L. Hart.
Railway passenger trains in motion, facilitating the passage of persons along the outside of—1748—W. J. Baker.
Railway rolling stock—1745—T. Macneill.
Railways, actuating the switches of—1732—W. Thomson.
Reaping and mowing machines—1764—H. Tyerman.
Ribbed pile fabrics—1774—J. Clegg and J. Smith.
Rulers—1620—R. E. Hodges.
Safes—792—T. Sagar and G. Keighley.
Safes—1598—F. W. Kurz.
Self-acting railway signals—1766—H. Wootton.
Sewing machinery—1779—A. V. Newton.
Spinning frames—1747—C. D. Knapson.
Stays and corsets, busks of—1771—R. A. Young.
Steam engines, pistons of—1700—W. Buckley and L. Smith.
Steering apparatus—1783—A. V. Newton.
Studs and buttons—1733—J. Ashton.
Valves—1740—H. Griffin.
Vegetable fibres, treating—1761—W. Staufen.
Venetian blinds and fittings—1706—E. Ambrose.
Washing machines—1731—L. S. Pilkington.
Weaving, looms for—1630—W. Robertson and J. G. Orchar.
Weaving, looms for—1775—T. Sagar and T. Richmond.

Patents Sealed.

119. A. S. Brooman.
130. J. Hooker.
131. F. Campbell and W. Burgess.
134. A. S. Brooman.
136. A. V. Newton.
138. D. F. Lecocq.
140. C. H. Roeckner.
141. M. A. Muir and J. McIlwham.
143. J. Samwells and S. Nye.
147. W. C. Mann.
148. R. Cherry, E. Crossley, and W. Bower.
152. W. Ager.
155. C. J. Crondace and J. Field.
157. T. Allen.
158. J. Banfill.
159. J. Wyld and J. Kershaw.
160. E. & T. Feather, and J. Luty.
166. D. Adamson.
198. C. W. Orford.
211. B. Walker & J. F. A. Pflaum.
223. W. Clark.
251. T. Marshall & H. C. Pretty.
256. J. H. Johnson.
275. A. B. Childs.
285. W. Clark.
382. W. S. Laycock.
385. J. B. Atwater.
591. J. H. Johnson.
~~663. W.~~ A. Verel.
699. G. T. ~~Bo~~usfield.
727. A. V. Newton.
669. G. McKenzie.
967. E. Pearson.
1254. H. A. Manfield.

From Commissioners of Patents' Journal, July 17th.

Patents Sealed.

169. W. Hibbert.
173. J. A. Nicholson.
175. J. Shekleton & J. W. Gibson.
184. G. Tanner and G. Parkes.
190. W. E. Gedge.
192. J. B. Shillcock.
193. A. Bryson.
194. W. K. Hall.
201. J. Dearden and E. P. Holden.
225. G. Bear.
244. L. D. Phillips.
259. E. Ambrose and W. Braddon.
267. M. A. F. Mennons.
287. J. Berrie.
288. J. B. Dalhoff.
303. R. Clayton, J. Raper, J. Goulding, & W. Howarth.
335. J. and P. Warburton, and S. Barnes.
409. G. F. Russell.
437. A. V. Newton.
642. V. Larnaudès.
853. W. Clark.
1378. H. Grafton.
1384. G. Haseltine.
1449. G. Haseltine.

Patents on which the Stamp Duty of £50 has been Paid.

1773. M. Henry.
1734. M. W. Ruthven.
1738. R. A. Brooman.
1753. L. M. Bournique and J. B. Vidard.
1754. L. M. Bournique and J. B. Vidard.
1771. W. Clark.
1774. R. A. Brooman.
1760. J. Davidson.
1770. W. T. Cheetham.
1881. W. E. Newton.

Patents on which the Stamp Duty of £100 has been paid.

1647. W. E. Newton.